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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,670	10/20/2003	Ching-Pin Wang	WANG3202/EM	9342

23364 7590 01/24/2007  
BACON & THOMAS, PLLC  
625 SLATERS LANE  
FOURTH FLOOR  
ALEXANDRIA, VA 22314

EXAMINER
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SHENG, TOM V

ART UNIT	PAPER NUMBER
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2629

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/687,670	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> Tom V. Sheng	<b>Art Unit</b> 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son (US 2002/0080121 A1), hereinafter Son.

As for claim 1, Son teaches an optical input device (fig. 6; paragraph 33) capable of determining properties of a reflective plane, comprising:

a light device (light source 24; paragraph 35), to project an incident light onto a reflective plane (as shown);

a first photosensor (first sensor in IC 27; fig. 7), to receive diffusing light produced on the reflective plane by the incident light (light reflected upon the surface and condensed on the first sensor; paragraph 37), compute a total diffusing light and accordingly determine unevenness and micro-scragginess of the reflective plane to find distance and direction moved by the optical input device (light received by the first sensor is inherently analyzed by logic circuit of IC 27; naturally the reflected light is influenced by any unevenness and micro-scragginess of the surface);

a second photosensor (second sensor in IC 27; fig. 7), to sense reflecting light produced on the reflective plane by the incident light (though not specifically mentioned; a smaller amount of reflected light is condensed on the second sensor. See the smaller arrows of reflected light going to the second light-receiving lens.).

However, Son does not teach "to compute a value of transmitting light produced when the incident light passes through the reflective plane and accordingly determined properties of the reflective plane according to values of the total diffusing light, the reflecting light and the incident light.

Son's optical mouse works on either a general surface or further over a glass layer by means of the first and second optical sensors respectively. See fig. 7 and 8; paragraphs 36-39. Specifically for fig. 8, Son's light received at the first sensor is the light reflected at the glass surface and thus corresponds to claimed diffusing light, and light received at the second sensor is the light transmitted through the glass surface and subsequently reflected at the general surface and thus corresponds to claimed reflecting light. Moreover, the light information processed by the logic circuit of IC 27 would then obviously be sent to a CPU of an associated computer for movement determination. In the determination, the claimed diffusing light (Son's reflected light at glass surface) and the reflecting light (Son's reflected light at the general surface) would both be taken into account, which is functionally equivalent to taking into consideration of the transmitting light and the properties of the reflective plane (i.e. the glass surface).

Therefore, it would have been obvious to alternatively determine mouse movement by determining transmitted light (if any) and thus the reflective/transmissive properties of the plane in order to provide an accurate determination of the mouse movement/position because of the functional equivalence in above two determination methods. Moreover, it would have been obvious to enhance the logic circuit of IC 27 to further perform the computations as a way of alleviating the load of the CPU.

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As for claim 3, Son teaches an optical mouse (fig. 6; paragraph 33).

As for claim 4, Son does teach an opening at the bottom, as shown in fig. 6, for providing incident light to a surface.

As for claim 5, Son's first optical sensor is directly above the opening towards the left (fig. 6).

As for claim 6, Son's second optical sensor receives reflecting light at surface 28 (fig. 6) and thus broadly reads on "disposed in a path corresponding to the reflecting light projected by the light device."

As for claim 7, Son teaches using an LED as a light source (fig. 1; paragraph 6).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Son as applied to claim 1 above, and further in view of Admitted Prior Art.

As for claim 2, Son as modified teaches determining movement of the optical mouse by taking into consideration of diffused light, reflected light and the deduction of transmitted light. However, Son does not specifically teach computing transmitted light using the equation:  $R_r = I - R_1 - f(L)$ .

On the other hand, the Applicant admitted that according to the law of energy conservation, the transmitted light would be necessarily of the form above (paragraphs 15-16). Since the diffused light and reflected light are measured by the first and second optical sensors and incident light is known, transmitted light  $R_r$  can be easily calculated.

Therefore, it would have been obvious for one of ordinary skill in the art to use the equation:  $R_r = I - R_1 - f(L)$  for computing the value of the transmitting light since the equation is well known and all the parameters are known or readily measurable.

### ***Response to Arguments***

4. Applicants' arguments filed on 10/10/2006 have been fully considered but they are not persuasive.

Applicants argue that both sensors in the Son patent are arranged to receive reflected light. The Examiner disagrees as actually Applicant's diffused light is also necessarily a reflected light (in a scattered/diffused manner). The first optical sensor of Son is clearly positioned in order to measure diffused/scattered light.

Applicants argue that the Son patent only takes into account reflecting light and does not consider transmitting light through the reflective surface. As analyzed above, Son as modified would calculate transmitting light in order to properly determine mouse movement.

Applicants argue that no provision is made to compare the received reflected light with the incident light to determine how much light has been transmitted and does not reach either sensor. As analyzed above, Son as modified would teach calculating the transmitting light which is the amount of light not reaching either sensor. Both optical sensors of Son are working either with a general surface or a glassy surface (fig. 7 and 8).

Applicants argue that Son's first and second optical sensors are used for different surfaces. The Examiner agrees as to the nature but also would like to point out that both sensors are working together no matter what the surface is. It is the task of the logic circuit or CPU to process the data.

Finally, the Applicants argue Son's optical mouse does not include any circuitry for calculating the total diffusing light and transmitting light. The Examiner disagrees as modified Son teaches calculating transmitting light based on the law of energy conservation.

### ***Conclusion***

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom V. Sheng whose telephone number is (571) 272-7684. The examiner can normally be reached on 9:00am - 6:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tom Sheng

AMR A. AWAD  
SUPERVISORY PATENT EXAMINER  
